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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MENON, KRISHNAN S

ART UNIT

PAPER NUMBER

1723

DATE MAILED: 06/03/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/831,001

Applicant(s)

CUYPERS ET AL.

Examiner

Krishnan S Menon

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1723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 13-24 are pending in the application.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13, and 15-18 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by WO 97/49477.

WO 97/49477 discloses a device for treating a gas/liquid mixture comprising a tube (1 – fig 1) with inlet (A-fig1) and outlet (8-fig 1), rotating means (5-fig 1), outlet openings down-stream of the rotating means for lateral flow of the liquid drops (9-fig 1), an axial return conduit centrally located through the rotating means (12-fig 1), and divergence means close to the outer end of the return conduit (7-fig 1) as in instant claim 13.

The divergence means is a conical element as in instant claim 15 (7-fig 1).

The outlet openings are a number of longitudinal slots as in instant claim 16 (9-fig 1)

The rotating means is a swirl element with varying outflow angle as in instant claim 17 and 18.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477.

WO 97/49477 teaches all the limitations of claim 13 as above. Claim 19 adds further limitation of the size of the separated droplets, which WO 97/49477 does not teach. However, it would be obvious to one of ordinary skill in the art at the time of invention to realize that the separation apparatus having similar structure as in the present application would generate similar sized droplets in a gas-liquid separation.

2. Claim 14, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view of Hodgson (US 4,187,089).

WO 97/49477 teaches all the limitations of claim 13 as above. WO 97/49477 does not disclose a number of slots in the return conduit as the divergence means as in instant claim 14. Hodgson (089) teaches a number of vertical slots formed between baffle plates (46-fig 1) and the conical end cap (44-fig 1) at the end of the tube (24-fig 1) for diverging the fluid mixture radially outwardly from the tube (24-fig 1). It would be obvious to one of ordinary skill in the art at the time of invention to use the teachings of Hodgson (089) to have the slots and the conical end-cap at the end of the return conduit instead of the cone-shaped end of the return conduit of WO 97/49477 because Hodgson (089) teaching would coalesce the droplets carried in the mixture stream of the

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return conduit more efficiently and improve the lateral divergent flow of the stream (col 3 lines 28-30).

Claims 20 and 21 add further limitations as follows: WO 97/49477 discloses an installation (page 2 line 17- page 3 line 2; fig 1) having a vessel with a supply connections stub (A-fig 1), one or more boxes in which one or more devices for treating gas/liquid mixture is arranged (page 2 line 34 – page 3 line 2) as in instant claims 20 and 21. WO 97/49477 does not describe a liquid drain conduit from the bottom of the vessel as in claim 20. Hodgson teaches a liquid drain from the bottom of the vessel (50,52-fig 1). It would be obvious to one of ordinary skill in the art at the time of invention to provide a drain for the liquid as taught by Hodgson in the teaching of WO'477 for disposing the collected liquid.

3. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view of WO 93/05339.

WO 97/49477 discloses a device according to claim 13 as described above, with inlet opening for the mixture (A-fig 1), and rotating means for setting the mixture to a rotating motion (5-fig 1) as in instant claim 22.

WO 97/49477 does not disclose a conical outlet with 1-30 deg cone angle as in instant claim 22 and 23 or an additional tube part as in instant claim 24. WO 93/05339 teaches such a conical outlet (3, fig 1) and an additional tube part (9-fig 1) in the outlet of a similar liquid-gas mixture separation device. It would be obvious to one of ordinary skill in the art at the time of invention to use the teachings of WO 93/05339 in the teachings of WO 97/49477 to make the outlet end conical with the additional tube part because it would decrease the carry over of the liquid droplets in the gas stream as taught by WO 93/05339 (lines 20-37, page 10)

Response to Arguments

Argument regarding claim 19, droplet size: WO 97/49477 teaches an apparatus having similar structure for separation of similar liquid gas mixture, and therefore, similar sized droplets could be expected in the separated part of the mixture.

Argument regarding the divergent means in claim 13: Claim 13 recites a divergent means to allow reintroduced flow to diverge laterally outward. Part 7 of fig 1 of WO 97/49477 is a divergent means allowing the reintroduced flow to diverge laterally.

Re argument that '477 reference does not teach a liquid drain: '477 teaches discharge of the separated liquid in lines 30-34 of page 2. Agreed that the feedback lines B and D show feedback paths for the gas to the secondary inlet 11 in Fig 1, this feedback happens due to the low pressure at the outlet of internal channel 6 (see lines 1-8, page 4). However, the device of fig 1 is inside a larger pipe as taught in lines 17-34 of page 2. The liquid that comes out of the slots 9 would flow down the inside of this larger pipe to the bottom, which provides the conduit for the drain, or the liquid discharge path.

Arguments re Hodgson ref: Hodgson ref teaches a conical end cap 44 (fig 1 and 2) with spaced baffles (ribs) 46 at the end of the pipe gas flow pipe 38, which provides a structure for laterally diverging the gas-liquid mixture coming through the pipe 38. Re the pipe 38 being horizontal or vertical should not make any difference to this flow. Having slots at the end of the pipe instead of having the ribs as provided by Hodgson is only an obvious variation of the structure.

Re '339 ref: applicant agrees that the '339 ref teaches a conical perforated tube section 3, with an outlet tube 9 mounted concentric to conical-section 3. Now, this outlet tube extends in the upstream direction into tube 1 up to the point marked 10 in fig 1. Claims 22-24 recites this

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structure. Ref '339 is used only for this structure and is not intended to overcome any other deficiencies of ref '477.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 703-305-5999. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 703-308-0457. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Krishnan Menon
Patent Examiner
June 2, 2003


W. L. WALKER
SUPERVISORY PATENT EXAMINER
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